

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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IN THE APPLICATION OF: RICHARD M. LANGE AND LEONARD E. ORZECH

DOCKET NO.: 3224R

CUSTOMER NUMBER: 26645

SERIAL NO.: 10/730,685

EXAMINER: P. C. SINGH

FILED: DECEMBER 8, 2003

GROUP ART UNIT: 1764

TITLE: TRACTION FLUIDS BY COUPLING OF CYCLIC HYDROCARBON  
MONOMERS WITH OLEFINS

Wickliffe, Ohio

Dated: February 9, 2007

Hon. Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**REQUEST FOR CONTINUED EXAMINATION UNDER 37 C.F.R. 1.114**

The Undersigned hereby requests that Examination of the above case (after final rejection) be continued under the provisions of 37 C.F.R. 1.114.

**PAYMENT OF FEE UNDER 37 C.F.R. 1.17 (E)**

Please charge the required fee for continued examination, which is believed to be \$790.00, to Deposit Account No. 12-2275 (The Lubrizol Corporation)

**AMENDMENT**

Please enter the amendments submitted on January 10, 2007, which were not entered at that time. The list of claims, as amended, is repeated below for convenience. Support for the additional language in claims 1 and 22 is found on page 7 at line 26. Support for new claim 27 is found on page 8 at line 1. Claim 2 is canceled without prejudice. No elements of the claims are amended other than specifying the number of monomer units in the addition product.

The substantive response from January 10, 2007, is also repeated thereafter.

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or <input type="checkbox"/> is being transmitted by facsimile to the United States Patent and Trademark Office or <input checked="" type="checkbox"/> is being filed electronically.	
on <u>February 9, 2007</u>	By: <u>Terri Pecjak</u>

CLAIM AMENDMENTS

Claim 1. (currently amended) A composition suitable for use as a traction fluid, comprising a substantially completely hydrogenated addition product of

(a) at least one vinyl arene monomer containing a cyclic hydrocarbon structure, with

(b) at least one branched non-cyclic olefin monomer of at least 4 carbon atoms, provided that if the non-cyclic olefin monomer is monounsaturated, then it contains at least 5 carbon atoms;

wherein said addition product comprises a dimer or oligomer containing up to 4 total units of (a) and (b) monomers.

Claim 2. (canceled)

Claim 3. (original) The composition of claim 1 wherein said hydrogenated condensation product has a Brookfield viscosity of less than about 70 Pa-s (70,000 cP) at -30°C.

Claims 4 – 5. (canceled)

Claim 6. (previously presented) The composition of claim 1 wherein the vinyl arene is styrene,  $\alpha$ -methylstyrene, or a ring-alkylated styrene.

Claims 7 – 8. (canceled)

Claim 9. (previously presented) The composition of claim 1 wherein the branched non-cyclic olefin monomer (b) contains 1, 2, or 3 ethylenic double bonds.

Claim 10. (previously presented) The composition of claim 1 wherein the branched non-cyclic olefin monomer (b) is selected from the group consisting of 2-methylbutene, branched hexenes, branched octenes, branched decenes, propylene trimers, propylene tetramers, and isobutylene dimers, trimers, and tetramers.

Claim 11. (previously presented) The composition of claim 1 wherein the branched non-cyclic olefin monomer (b) is isoprene.

Claim 12. (previously presented) The composition of claim 1 wherein the branched non-cyclic olefin (b) is a non-cyclic terpene.

Claim 13. (original) The composition of claim 1 wherein components (a) and (b) each comprise about 10 percent to about 90 percent by weight of the total of all monomers present in the addition product.

Claim 14. (previously presented) The composition of claim 1 wherein (a) comprises 40 to 80 weight percent of all monomers present in the addition product, and (b) comprises 60 to 20 weight percent of all such monomers.

Claim 15. (original) The composition of claim 1 wherein said fluid is prepared by the acid-catalyzed addition reaction of the monomers of (a) and (b).

Claim 16. (original) The composition of claim 15 wherein said addition reaction is conducted in the presence of a solvent.

Claim 17. (original) The composition of claim 1 further comprising at least one additive selected from the group consisting of dispersants, detergents, friction modifiers, antioxidants, metal passivators, viscosity modifiers and antiwear agents in an amount sufficient to improve the performance of said composition in a power transmission device.

Claim 18. (original) The composition of claim 1 further comprising an oil of lubricating viscosity other than said hydrogenated addition product.

Claim 19. (original) The composition of claim 1 further comprising at least one additional traction fluid.

Claim 20. (original) The composition of claim 1 comprising a plurality of said hydrogenated addition products having differing viscosities.

Claim 21. (original) A method for lubricating a power transmission apparatus, comprising employing therein the composition of claim 1.

Claim 22. (currently amended) A method for preparing a composition suitable for use as a traction fluid, comprising:

(a) combining

(i) at least one vinyl arene monomer containing a cyclic hydrocarbon structure, with

(ii) at least one branched non-cyclic olefin monomer of at least 4 carbon atoms, provided that if the olefin monomer is monounsaturated, then it contains at least 5 carbon atoms; and

(iii) an acid catalyst;

(b) maintaining the resulting mixture at about 25°C to about 150°C for a time sufficient to permit reaction of components (a)(i) and (a)(ii);

(c) optionally removing the volatile components from the product of (b);

and

(d) substantially completely hydrogenating the resulting reaction product;

wherein said addition product comprises a dimer or oligomer containing up to 4 total units of (a) and (b) monomers.

Claim 23. (original) The method of claim 22 wherein the acid catalyst is a sulfur acid, a phosphorus acid, or a halogen acid.

Claim 24. (original) The method of claim 22 wherein the acid catalyst of (iii) is a heteropolyacid in its acid, salt, or partially salted form.

Claim 25 (previously presented) The method of claim 22 wherein the acid catalyst of (iii) is a Lewis acid or a sulfonated crosslinked polystyrene resin.

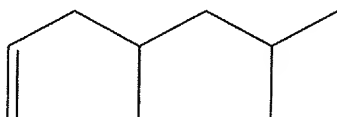
Claim 26 (previously presented) The composition of claim 1 wherein the vinyl arene comprises a naphthalene nucleus.

Claim 27 (new) The composition of claim 1 wherein said addition product comprises a dimeric product being the 1:1 mole adduct of (a) and (b).

Response and Request for Reconsideration.

Claim Objection

The examiner had objected to claim 10 in that he believed that the terms “propylene trimers” and the like should actually be termed monomers. Actually, the terminology is correct. The names “propylene trimers” and the like are established terms of art which refer to the olefins which are prepared by trimerization (or dimerization or tetramerization) of propylene (or isobutylene). “Propylene trimer” is the common name for a branched nonene prepared from propylene, e.g.:



Similarly, “propylene tetramer” is a name for branched dodecene, and isobutylene dimers, trimers, and tetramer are branched octanes, dodecenes, and hexadecenes, respectively. This common terminology is confirmed by its use in the Kirk-Othmer Encyclopedia of Chemical Technology, Third Edition (1978) vol. 2 page 82, where diisobutylene, propylene trimer, and propylene tetramer are each referred to as olefins (suitable for use in manufacture of alkylphenols). A pdf copy of this document was provided with response of January 10, 2006, and should be readily available to the Examiner. The Undersigned will gladly resubmit it upon the Examiner’s request.

Accordingly, it is requested that the objection to claim 10 be removed.

Rejection Under 35 USC 103

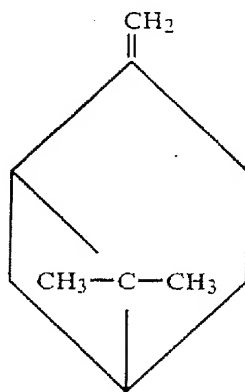
The Examiner has rejected all claims as made obvious by the disclosure of Chen et al. in view of Johnson et al., or, as to some claims, in combination with Johnson et al. and Tipton.

With regard to the combination of Chen with Johnson, Applicants had argued in the response submitted September 12, 2006, that one would not look to Johnson to obtain the low molecular weight mixed dimers and trimers of the present invention, as Johnson prepares relatively high molecular weight polymers. The Examiner had objected that the argument was not persuasive, specifically because a low molecular weight limitation for the adducts did not appear in the claims.

The present claims are now directed to low molecular weight dimeric or oligomeric adducts, that is, addition products comprising a dimer or oligomer containing up to 4 total units of (a) and (b) monomers. Claim 27 further specifies that the addition product comprises a dimeric product being the 1:1 mole adduct of (a) and (b). It is believed that this limitation should overcome the Examiner’s objection.

None of these dimeric, trimeric, or tetrameric adducts are suggested by Johnson. Johnson discloses a method for preparing high vinylidene polyisobutylene having an  $M_n$  of at least 1500 (col. 1 line 7 and col. 3 line 56). Polyisobutylene of molecular weight 1500 will consist of about 26 monomer units, which is far removed from the 4 total monomer units presently claimed. Moreover, the specific teaching of olefin/styrene copolymers, found in col. 7 lines 43-45, is of a copolymer of 95% by weight isobutylene with 5% by weight of styrene. This corresponds to 97.2 mole % isobutylene and 2.8 mole % styrene, or a copolymer of at least 35 isobutylene monomer units for each styrene monomer. This is also very far removed from the presently claimed adducts containing at most 4 monomer units total. There is no motivation, based on the long chain polymers of Johnson, to arrive at the compositions comprising very short mixed dimers, trimers, or tetramers of the present invention.

Additionally, the Examiner's stated reasons for the motivation to combine the teachings of Chen and Johnson appears to be faulty. Chen seeks to oligomerize monocyclic or bicyclic olefins to prepare traction fluids having high traction coefficients. In an example,  $\beta$ -pinene is copolymerized with isobutylene.



$\beta$ -Pinene

It appears to be the Examiner's contention that, since it is known that isobutylene can also be copolymerized with a small amount of styrene, it would be obvious to polymerize isobutylene with styrene with the expectation that such a (long chain) product would be a useful traction fluid having a high traction coefficient. This supposition is groundless. Johnson indicates that his polymers may be useful in the field of lubricating oil additives. The context of this statement is first made in connection with discussion of the Boerzel reference in column 1. Here it specifically states that such a polymer may be reacted with maleic anhydride and then, in turn, with polyamines, to form products [i.e., known as dispersants] useful as lubricating oil additives. See also column 6, line 7, where again there is mention that the imide derivatives may be used as

additives for lubricants. There is simply no indication that the polymers of Johnson, by themselves, even if they were modified to be only short chain oligomers, would be useful for the purpose sought by Chen, preparing a traction fluid. Also, it should be apparent that the carbon architecture of  $\beta$ -pinene is significantly different from that of the styrene employed by Johnson, making it even less reasonable to postulate utility as Chen's traction fluid.

Accordingly, it is submitted that the claimed subject matter of claim 1 is unobvious. The other independent claim, 22, is unobvious for the same reasons. Each of the dependent claims, being narrower than the independent claims from which they depend, is likewise unobvious.

Conclusion.

For the foregoing reasons it is submitted that the present claims are in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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